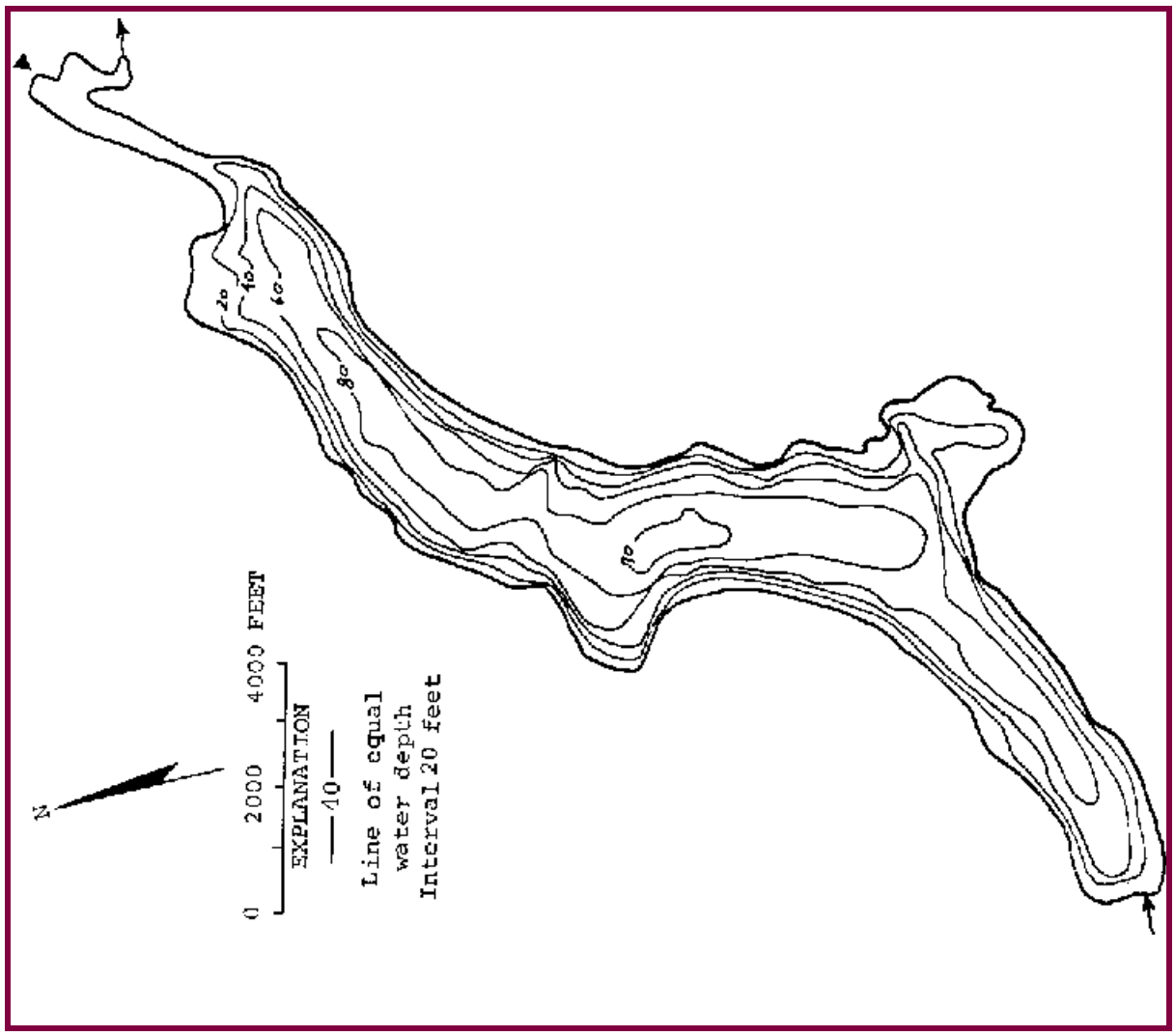
MASON

MASON County *Lake ID:* MASMA1

Ecoregion: 2

Mason Lake is located eight miles southwest of Belfair. It is four miles long and is fed by Shumocher Creek. Mason Lake drains via Sherwood Creek to North Bay and Case Inlet. It is the largest and deepest lake in Mason County.

Area (acres)	*Maximum Depth (ft)*	*Mean Depth (ft)*	*Drainage (sq mi)*	
1000	90	48	20	
Volume (ac-ft)	***Shoreline (miles)***	***Altitude (ft abv msl)***	***Latitude***	***Longitude***
49000	10.9	194	47 21 14.	122 55 17.



Station Information

MASMA1

Secondary Station	Station # 1	latitude:	longitude:
	Description:	Located approximately 3500 feet up from the inlet at the southern end of the lake. The station is midway between the east and west shorelines at a spot where the water is about 60 feet in depth.	
Secondary Station	Station # 2	latitude:	longitude:
	Description:	Located at the far southern end of the 80 foot contour line (see bathymetric map) midway between both shorelines. Station is directly across from a concrete boathouse on the western shore and a brown house on the eastern shore.	
Secondary Station	Station # 3	latitude: 47 19 38.7	longitude: 122 56 17.0
	Description:	Located at the northern end of the 60 foot contour line, midway between both shorelines (see bathymetric map). The station is directly across from a red boathouse on the western shore and a yellow boathouse on the eastern shore.	
Primary Station	Station # 4	latitude: 47 20 16.0	longitude: 122 57 18.1
	Description:	Located in the deepest part of the lake in the middle of the 90 foot contour line (see the bathymetric map). The station is in the approximate center of a line extending from the southern edge of a large cove on the western shore to a smaller cove on the east shore.	
Secondary Station	Station # 5	latitude:	longitude:
	Description:	Located approximately 2 miles south of the boat launch. The station is midway between the east and west shorelines and where the water depth is about 80 feet.	

Trophic State Assessment for 1998

MASON

Analyst: KIRK SMITH

TSI_Secchi:	32
TSI_Phos:	24
TSI_Chl:	31
Narrative TSI:[a]	O

Mason Lake is an oligotrophic lake in the Puget Lowlands ecoregion. Mason Lake remains relatively clear despite the densely developed shoreline. The watershed is mostly timber and some of it has been clear-cut within the last decade. This disturbance in the watershed has not shown any apparent impact on lake nutrient concentrations; Ecology records do not indicate an increase in total phosphorus concentrations throughout the decade. Although water clarity is very good, blooms of blue-green algae (Gleotrichia sp.) are apparent in mid and late summer. The first invasion of Eurasian milfoil (Myriophyllum spicatum) on Mason Lake was observed in 1998 along the east shore, midlake. Although the watershed appeared fairly stable (even in the clear-cut areas), it was rare to see any natural habitat along the shoreline. The habitat survey revealed considerable human disturbance in the riparian and littoral zones. These disturbances could adversely impact fish

populations. The results of the user survey suggests the water clarity is sufficient to support primary contact uses--although only 3 surveys were returned. Our 1998 sampling found a mean total phosphorus concentration of 4.3 ug/L. Although there may be reason to suspect impairment to habitat from human disturbance and there is a potential for increased phosphorus loading from the recent milfoil introduction, there is not enough information to conclude that there is currently any impairment to the uses of the lake. Milfoil most likely offers the biggest threat to beneficial uses in the near future.

The phosphorus criterion for Mason Lake could be set at 10 ug/L, the action value in the water quality regulations for Puget Lowlands Oligotrophic lakes; however, to protect this valuable resource from degradation, we recommend a criterion be set at 7.3 ug/L, the current total phosphorus concentration plus an adjustment for inter-annual variability.

[a] E=eutrophic, ME=mesoeutrophic, M=mesotrophic, OM=oligomesotrophic, O=oligotrophic

Chemistry Data

MASON

Date	Time	Strata	Tot P (ug/L)	Tot N (mg/L)	TN:TP	Chloro-phyll (ug/L)	Fecal Col. Bacteria (#/100mL)	Hardness (mg/L)	Calcium (ug/L)	Turbidity (NTU)
Station 0										
7/26/1998		L					4			
		L					1 U			
8/18/1998		L					22			
		L					1			
Station 3										
6/4/1998		E	5.8	.104	18					
7/26/1998		E	3.8	.081	21	.73				
9/18/1998		E	4.3							
Station 4										
6/4/1998		E	5.3	.121	23	1.2		19.8	4560	.5 U
		H	6.1 J	.081	13					
7/26/1998		E	3.1	.09	29	.5 U				.5 U
		H	5	.068	14					
8/18/1998		E	3.7	.087	24	1.1				.5 U
		H	8.5	.066	8					
9/18/1998		E	5.2	.066	13	1.2				.5 U
		H	14	.04	3					

Strata: L=lake surface, E=epilimnion, H=hypolimnion; Qualifier: J=Estimate, U=Less than

Watershed Survey

MASON

Survey Date: 9/18/1998

Land Uses (1 = Primary, 2 = Secondary, etc.)

	Agriculture(commercial, not hobby)	1	**Residential**
	Commercial, Industrial	2	**Park, forest or natural**
	Major transportation		

Impervious surfaces (Roads and parking area): No Curbs

Observations (check mark denotes presence)

BMP's ☐

Extensive clear cutting on the hill at the west side of the lake. The cutting looked recent, perhaps within the last 5 - 8 years.

Odors ☐

Cattle ☐ **Ducks** ☐ **Geese** ☐

Fertilizers and weed killers appear to be used in residential or agriculture area ☑

Fertilizers and weed killer appear to be in use on lakeshore property.

Buffer zones around streams and wetlands ☑

There is one small patch of buffer zone along lakeshore. This appears to be Simpson property at the very northwest end of the lake.

Irrigation ☐

Survey Id: 50

Habitat Survey Summary Report

MASON

Data are averages of ***10*** **Stations Surveyed** **Date of Visit:** 9/14/1998

Vegetation Type (Avg. only of sites w/ vegetation present; 1=coniferous, 3=deciduous)

Canopy Layer Avg:	1.4	**Number of stations with canopy:**	10
Understory Avg:	2.1	**Number of stations with understory:**	10

Percent Areal Coverage (0 = absent, 1 = <10%, 2 = 10-40%, 3 = 40-75%, 4 = >75%)

Canopy Layer:	**trees > 0.3 m DBH**	2.3
	trees< 0.3 m DBH	1.0
Understory:	**woody shrubs saplings**	2.4

	tall herbs, forbs grasses	1.1
Ground Cover:	**woody shrubs seedlings**	1.7
	herbs, forbs, grasses	3.2
	standing water or inundated veg	0.3
	barren or buildings	1.6
Substrate Type (within shoreline plot):	**bedrock**	0.0
	boulders	0.0
	cobble/gravel	3.1
	loose sand	0.6
	other fine soil/sediment	1.2
	vegetated	1.0
	other	0.4
Bank Features:	**angle (O:<30; 1: 30-75; 2:nr vertical)**	0.2
	vertical dist (M from wtrln to high wt):	0.3
	horiz. dist. (M from wtrln to high wt):	0.2

Human Influence (0 = absent, 1 = adjacent to or behind plot, 2 = present within plot)

buildings	1.5
commercial	0.0
park facilities	0.0
docks/boats	1.5
walls, dikes, or revetments	1.3
litter, trash dump, or landfill	0.4
roads or railroad	0.0
row crops	0.0
pasture or hayfield	0.0
orchard	0.0
lawn	1.6
other	0.0

Physical Habitat Characteristics

station depth (at 10 m from shore)	2.5

Bottom Substrate (0 = absent, 1 = <10%, 2 = 10-40%, 3 = 40-75%, 4 = >75%)

bedrock	0.1
boulders	0.1
cobble	1.1
gravel	2.3
sand	2.2
silt	1.5
woody debris	0.8

Macrophyte Areal Coverage (0 = absent, 1 = <10%, 2 = 10-40%, 3 = 40-75%, 4 = >75%)

submergent	1.3

emergent	0.3
floating	0.1
total weed cover	1.3
Do macrophytes extend lakeward (-1 = yes, 0 = no)	-1.0

Fish Cover (0 = absent, 1 = Present but sparse, 2 = moderate to heavy)

aquatic weeds	1.3
snags	0.0
brush or woody debris	0.4
inundated live trees	0.0
overhanging vegetation	0.2
rock ledges or sharp dropoffs	0.0
boulders	0.1
human structures	1.3

Questionnaire

MASON

Results compiled from 3 **Surveys.** **Average time (years) respondents spent on lake:** 24.33

Did the following add (+1), detract (-1), or have no effect (0) on your enjoyment of the lake today?

Types of WaterCraft:	-0.3	View:	0.3	Distance to Lake:	0.0
Public Access:	-0.3	Swim Beach:	0.7	Canada Geese:	-1.0
Water Clarity:	0.3	Water Qual. for Swim:	0.3		
Fishing Quality:	0.0	Aquatic Plants:	-0.7		

On a scale of 1 (poor) to 5 (excellent), how would you rate water quality today? **4.3**

Which would you rather have, 1 or 2?

1) Better fishing and more natural habitat, or 2) clearer water?	1.7
1) Better fishing and more natural habitat, or 2) fewer aquatic plants?	1.3
1) Clearer water, or 2) fewer aquatic plants?	1.3

How important is each of the following characteristics to you (1 = very undesirable, 5= very desirable):

Restricted Watercraft:	4.0	Good Warmwtr Fishing:	4.0	Natural Scenery:	4.0
Plant Growth:	1.7	Good Swimming:	4.3	Public Beach:	1.3
Natural Shoreline:	3.3	Less Algae:	4.7	Canada Geese:	2.3
No Odors:	4.0	Public Access:	1.3		
Good Coldwtr Fishing:	4.0	Clear Water:	4.3		

Tabulated Results

Survey ID	Date	Residency	Rent or Own	Primary Activity*	Water Clarity: Purchase Factor?	Water Clarity: Has it Changed?	Water Clarity: When?
42	9/7/1998	Resident	Permanent	Rent	several of the above	☑	Worse	1985
	No more public access. Get rid of Canada geese and ducks.							
51	8/29/1998	Resident	Seasonal	Rent	10	☑	No	
	Better or more enforcement of state boating regulations							

59	8/29/1998	Resident	Seasonal	Rent	10	☐	No

* 1=canoe/kayak, 2=fish, 3=pers. wtrcrft, 4=mtrboat, 5=sail, 6=swim/wade, 7=watch wldlf, 8=ski, 9=windsurf, 10=relaxing

Zooplankton Report

MASMA1

Date 8/18/1998 Station: 1
Sample ID 27

Number of organisms measured: 174

Group	Percent
Cladoceran	12.1%
Copepod	87.9%
Other	

Group	Percent
Small < 1mm	98.3%
Large >= 1mm	1.7%
Ratio of large to Small:	0.02
Average size (mm):	0.46

Aquatic Plant Data

MASON

Sampler: Parsons, O'Neal

Survey Date: 9/14/1998

Max depth of growth (M): >6

Comments Sunny, calm. Surveyed entire shoreline, did habitat survey for Kirk Smith. Plants patchy, occasional dense areas of P. amplifolius, but many areas with open sediment. Much tiny ball-like algae suspended in water. M. spicatum only seen in Paradise Estates launch area. Observed a loon at south end, herons, few mallards, fish, osprey, heard frogs (didn't sound like adult bullfrogs).

SPECIES LIST

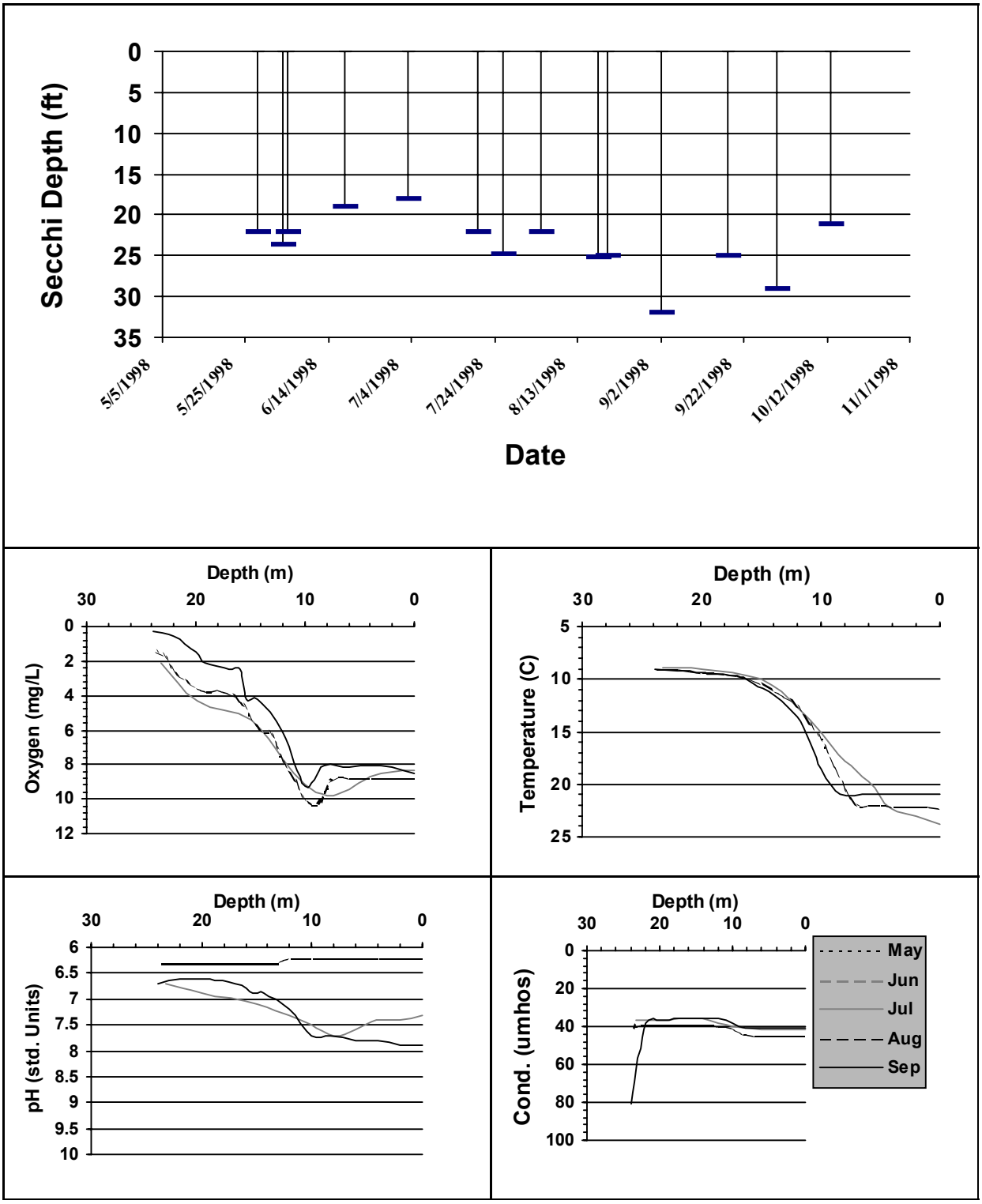
Scientific Name	Common Name	Dist [a]	Comments
Brasenia schreberi	watershield	1	
Carex sp.	sedge	1	
Elodea canadensis	common elodea	2	
Hippuris vulgaris	common marestail	1	
Iris pseudacorus	yellow flag	2	
Isoetes sp.	quillwort	3	
Juncus sp.	rush	2	
Lilaeopsis occidentalis	lilaeopsis	1	shallows and shoreline at SW end
Lobelia dortmanna	water gladiole; water lobelia	2	
Myriophyllum sp.	water-milfoil	1	looks like M. hippuroides
Myriophyllum spicatum	Eurasian water-milfoil	1	only found in the area of Paradise Estates boat launch
Nitella sp.	stonewort	2	
Nuphar polysepala	spatter-dock, yellow water-lily	1	only a couple of patches
Potamogeton amplifolius	large-leaf pondweed	3	
Potamogeton epihydrus	ribbonleaf pondweed	1	
Potamogeton gramineus	grass-leaved pondweed	2	also may be a hybrid
Potamogeton robbinsii	fern leaf pondweed	2	
Potamogeton sp (thin leaved)	thin leaved pondweed	1	low growing, no achenes
Ranunculus aquatilis	water-buttercup	2	
Sagittaria graminea	slender arrowhead	1	dense around private launch, NE end of lake

Utricularia sp.	bladderwort	1	may be U. inflata, very small winter buds
Vallisneria americana	water celery	2	

[a] 0 - value not recorded (plant may not be submersed)
1 - few plants in only 1 or a few locations
2 - few plants, but with a wide patchy distribution
3 - plants in large patches, codominant with other plants
4 - plants in nearly monospecific patches, dominant
5 - thick growth covering substrate to exclusion of other species

Secchi Depth and Profile Graphics

Station: 4 MASMA1



Secchi Data and Field Observations

MASON

Date	Time	Temp-erature (F)	Secchi (ft)	Color (1-greens, 11-browns	Bright-ness (pct)	Wind (1-none, 5-gusty)	Rainfall (0-none, 5-heavy)	Aesthetics (1-bad, 5-good)	Swimming (1-poor, 5-good)	Geese (#)	Waterfowl (besides geese #)	Boats-Fishing (#)	Boats-Skiing (#)
Station 2													
5/30/1998		14.4	22	2	75	2	1	5	5	0	0	0	0
	Sampler: HOLM			Remarks:									
6/13/1998		17.8	19	2	100	2	3	5	5	2	0	1	1
	Sampler: HOLM			Remarks:									
6/30/1998		20	17	2	75	2	1	5	4	0	0	0	0
	Sampler: HOLM			Remarks:									
7/16/1998		21.1	22	2	0		4	5	5	0	0	0	1
	Sampler: HOLM			Remarks:									
7/31/1998		24.4	21	2	100	1	3	5	4	0	0	0	1
	Sampler: HOLM			Remarks:									
8/13/1998		25	26	2	0	1	1	5	5	0	0	1	3
	Sampler: HOLM			Remarks:	BEAUTIFUL DAY.								
8/27/1998		23	25	2	0			5	5	0	0	0	1
	Sampler: HOLM			Remarks:									
9/11/1998		23	27	2	0	1	1	5	5	0	0	0	0
	Sampler: HOLM			Remarks:									
9/27/1998		20	29	2	0	1	3	5	5	0	0	0	1
	Sampler: HOLM			Remarks:									
10/13/1998		17	23	2	100	3	5	1	1	0	0	0	0
	Sampler: HOLM			Remarks:									
Station 3													
5/28/1998		15	22	2	0	3	2	5	5	0	0	0	0
	Sampler: SCOTT			Remarks:	LATE WITH TESTING DUE TO WEATHER.								

Date	Time	Temp-erature (F)	Secchi (ft)	Color (1-greens, 11-browns	Bright-ness (pct)	Wind (1-none, 5-gusty)	Rainfall (0-none, 5-heavy)	Aesthetics (1-bad, 5-good)	Swimming (1-poor, 5-good)	Geese (#)	Waterfowl (besides geese #)	Boats-Fishing (#)	Boats-Skiing (#)
6/10/1998		20	19	2	75	1	4	4	4	0	0	0	0
	Sampler: SCOTT			Remarks:									
6/22/1998		19	17	2	25	3	1	4	4	0	0	0	0
	Sampler: SCOTT			Remarks:									
7/9/1998		22	17	2	75	1	1	4	4	0	0	0	2
	Sampler: SCOTT			Remarks:									
7/24/1998		28	20	2	100	1	1	5	5	0	0	0	1
	Sampler: SCOTT			Remarks:									
8/8/1998		24	25	2	0	1	1	5	5	0	0	0	2
	Sampler: SCOTT			Remarks: SATURDAY.									
8/24/1998		22	21	2	100	1	1	4	4	2	0	0	2
	Sampler: SCOTT			Remarks:									
9/8/1998		23	25		100	1	1	4	4	0	0	0	0
	Sampler: SCOTT			Remarks:									
9/20/1998		23	27	2	0	1	2	3	3	0	0	0	0
	Sampler: SCOTT			Remarks: SUNDAY.									
Station 4													
5/28/1998		15	22	2	0	3	2	5	5	0	0	0	0
	Sampler: NELSON			Remarks: LATE GETTING STARTED DUE TO BAD WEATHER.									
6/3/1998		17	23.5	2	100	2	1	5	5	0	0	0	0
	Sampler: NELSON			Remarks:									
6/4/1998			22	2	100	4	1	5	4	0	1	0	0
	Sampler: SMITH			Remarks: VERY WINDY DAY. EXTREMELY DIFFICULT FOR SAMPLING. DRIFTING TOO MUCH FOR ZOO TOW. WSHED 100% TIMBER, SHORELINE ALL RESIDENTIAL (~400 HOMES). NO RESTRICTED USES. The Oxygen result is qualified as an estimate due to postcalibration failing QA/QC requirements.								

Date	Time	Temp-erature (F)	Secchi (ft)	Color (1-greens, 11-browns	Bright-ness (pct)	Wind (1-none, 5-gusty)	Rainfall (0-none, 5-heavy)	Aesthetics (1-bad, 5-good)	Swimming (1-poor, 5-good)	Geese (#)	Waterfowl (besides geese #)	Boats-Fishing (#)	Boats-Skiing (#)
6/18/1998		16.7	19	2	100	3	1	5	5	0	0	0	0
	Sampler: NELSON			Remarks:									
7/3/1998		18	18	2	75	3	3	5	5	0	0	0	0
	Sampler: NELSON			Remarks:									
7/20/1998		23	22	2	0	2	1	5	5	0	0	1	0
	Sampler: NELSON			Remarks:									
7/26/1998			24.7	6	0			3	5	6	9	0	0
	Sampler: SMITH			Remarks:									
8/4/1998		23	22	6	100	2	1	5	5	0	0	0	0
	Sampler: NELSON			Remarks:									
8/18/1998			25.08	2	90			5	5	0	13	1	4
	Sampler: SMITH			Remarks:	WATER REALLY SHALLOW AT BOAT RAMP. VERY SLIGHT BLUE-GREEN BLOOM. The pH results are qualified as estimates due to postcalibration failing QA/QC requirements.								
8/20/1998		25	25	2	0	2	1				0	0	0
	Sampler: NELSON			Remarks:									
9/2/1998		23.9	32	2	0	1	1	5	5	0	0	0	0
	Sampler: NELSON			Remarks:									
9/18/1998		21.1	25	2	100	1	2	5	5	0	0	0	0
	Sampler: NELSON			Remarks:									
9/18/1998			24.75	2	80	1		5	5	0	7	0	0
	Sampler: SMITH			Remarks:									
9/30/1998		20	29	2	0	2	1	5	5	0	0	0	0
	Sampler: NELSON			Remarks:									
10/13/1998		17	21	2	100	3	5	1	1	0	0	0	0
	Sampler: NELSON			Remarks:									
10/13/1998			21		0					0	0	0	0
	Sampler: BELL-MCKINNON			Remarks:									